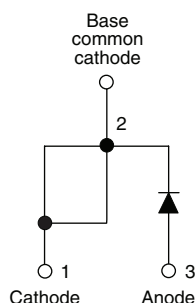


HEXFRED® Ultrafast Soft Recovery Diode, 30 A



TO-247AC modified

FEATURES

- Ultrafast recovery
- Ultrasoft recovery
- Very low I_{RRM}
- Very low Q_{rr}
- Guaranteed avalanche
- Specified at operating conditions
- Lead (Pb)-free
- Designed and qualified for industrial level



RoHS*
COMPLIANT

BENEFITS

- Reduced RFI and EMI
- Reduced power loss in diode and switching transistor
- Higher frequency operation
- Reduced snubbing
- Reduced parts count

DESCRIPTION

HFA30PB120 is a state of the art center tap ultrafast recovery diode. Employing the latest in epitaxial construction and advanced processing techniques it features a superb combination of characteristics which result in performance which is unsurpassed by any rectifier previously available. With basic ratings of 1200 V and 30 A continuous current, the HFA30PB120 is especially well suited for use as the companion diode for IGBTs and MOSFETs. In addition to ultrafast recovery time, the HEXFRED® product line features extremely low values of peak recovery current (I_{RRM}) and does not exhibit any tendency to “snap-off” during the t_b portion of recovery. The HEXFRED features combine to offer designers a rectifier with lower noise and significantly lower switching losses in both the diode and the switching transistor. These HEXFRED advantages can help to significantly reduce snubbing, component count and heatsink sizes. The HEXFRED HFA30PB120 is ideally suited for applications in power supplies and power conversion systems (such as inverters), motor drives, and many other similar applications where high speed, high efficiency is needed.

PRODUCT SUMMARY

V_R	1200 V
V_F at 30 A at 25 °C	4.1 V
$I_{F(AV)}$	30 A
t_{rr} (typical)	47 ns
T_J (maximum)	150 °C
Q_{rr} (typical)	120 nC
$di_{(rec)M}/dt$ (typical) at 125 °C	240 A/μs
I_{RRM} (typical)	4.7 A

ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	TEST CONDITIONS	VALUES	UNITS
Cathode to anode voltage	V_R		1200	V
Maximum continuous forward current	I_F	$T_C = 100\text{ °C}$	30	A
Single pulse forward current	I_{FSM}		120	
Maximum repetitive forward current	I_{FRM}		90	
Maximum power dissipation	P_D	$T_C = 25\text{ °C}$	350	W
		$T_C = 100\text{ °C}$	140	
Operating junction and storage temperature range	T_J, T_{Stg}		- 55 to + 150	°C

* Pb containing terminations are not RoHS compliant, exemptions may apply

ELECTRICAL SPECIFICATIONS (T _J = 25 °C unless otherwise specified)							
PARAMETER	SYMBOL	TEST CONDITIONS		MIN.	TYP.	MAX.	UNITS
Cathode to anode breakdown voltage	V _{BR}	I _R = 100 μA		1200	-	-	V
Maximum forward voltage	V _{FM}	I _F = 30 A	See fig. 1	-	2.4	4.1	
		I _F = 60 A		-	3.1	5.7	
		I _F = 30 A, T _J = 125 °C		-	2.3	4.0	
Maximum reverse leakage current	I _{RM}	V _R = V _R rated	See fig. 2	-	1.3	40	μA
		T _J = 125 °C, V _R = 0.8 x V _R rated		-	1.1	4000	
Junction capacitance	C _T	V _R = 200 V	See fig. 3	-	50	75	pF
Series inductance	L _S	Measured lead to lead 5 mm from package body		-	8.0	-	nH

DYNAMIC RECOVERY CHARACTERISTICS (T _J = 25 °C unless otherwise specified)							
PARAMETER	SYMBOL	TEST CONDITIONS		MIN.	TYP.	MAX.	UNITS
Reverse recovery time See fig. 5, 10	t _{rr}	I _F = 1.0 A, dI _F /dt = 200 A/μs, V _R = 30 V		-	47	-	ns
	t _{rr1}	T _J = 25 °C	I _F = 30 A dI _F /dt = 200 A/μs V _R = 200 V	-	110	170	
	t _{rr2}	T _J = 125 °C		-	170	260	
Peak recovery current See fig. 6	I _{RRM1}	T _J = 25 °C		-	10	15	A
	I _{RRM2}	T _J = 125 °C		-	16	24	
Reverse recovery charge See fig. 7	Q _{rr1}	T _J = 25 °C		-	650	980	nC
	Q _{rr2}	T _J = 125 °C		-	1540	2310	
Peak rate of fall of recovery current during t _b See fig. 8	dl _{(rec)M} /dt1	T _J = 25 °C		-	270	-	A/μs
	dl _{(rec)M} /dt2	T _J = 125 °C		-	240	-	

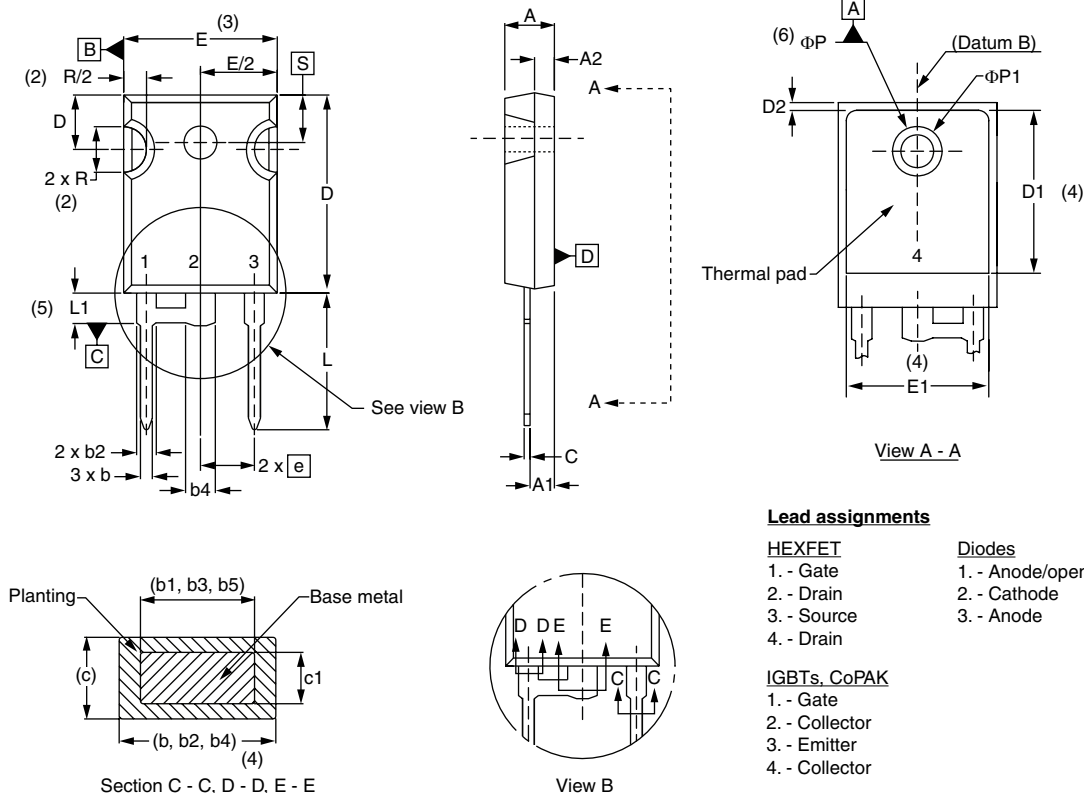
THERMAL - MECHANICAL SPECIFICATIONS						
PARAMETER	SYMBOL	TEST CONDITIONS	MIN.	TYP.	MAX.	UNITS
Lead temperature	T _{lead}	0.063" from case (1.6 mm) for 10 s	-	-	300	°C
Thermal resistance, junction to case	R _{thJC}		-	-	0.36	°C/W
Thermal resistance, junction to ambient	R _{thJA}	Typical socket mount	-	-	80	
Thermal resistance, case to heatsink	R _{thCS}	Mounting surface, flat, smooth and greased	-	0.50	-	
Weight			-	2.0	-	g
			-	0.07	-	oz.
Mounting torque			6.0 (5.0)	-	12 (10)	kgf · cm (lbf · in)
Marking device		Case style TO-247AC modified (JEDEC)	HFA30PB120			

ORDERING INFORMATION TABLE

Device code	HF	A	30	PB	120	PbF
	1	2	3	4	5	6
1	-	HEXFRED® family				
2	-	Process designator: A = Electron irradiated B = Platinum diffused				
3	-	Current rating (30 = 30 A)				
4	-	Package outline (PB = TO-247, 2 pins)				
5	-	Voltage rating (120 = 1200 V)				
6	-	• None = Standard production • PbF = Lead (Pb)-free				

TO-247 modified

DIMENSIONS in millimeters and inches



Lead assignments

HEXFET

1. - Gate
2. - Drain
3. - Source
4. - Drain

Diodes

1. - Anode/open
2. - Cathode
3. - Anode

IGBTs, CoPAK

1. - Gate
2. - Collector
3. - Emitter
4. - Collector

SYMBOL	MILLIMETERS		INCHES		NOTES
	MIN.	MAX.	MIN.	MAX.	
A	4.65	5.31	0.183	0.209	
A1	2.21	2.49	0.059	0.098	
A2	1.50	0.098	1.50	2.49	
b	0.99	1.40	0.039	0.055	
b1	0.99	1.35	0.039	0.053	
b2	1.65	2.39	0.065	0.094	
b3	1.65	2.37	0.065	0.094	
b4	2.59	3.43	0.102	0.135	
b5	2.59	3.38	0.102	0.133	
c	0.38	0.86	0.015	0.034	
c1	0.38	0.76	0.015	0.030	
D	19.71	20.70	0.776	0.815	3
D1	13.08	-	0.515	-	4

SYMBOL	MILLIMETERS		INCHES		NOTES
	MIN.	MAX.	MIN.	MAX.	
D2	0.51	1.30	0.020	0.051	
E	15.29	15.87	0.602	0.625	3
E1	13.72	-	0.540	-	
e	5.46 BSC		0.215 BSC		
ΦK	2.54		0.010		
L	14.20	16.10	0.559	0.634	
L1	3.71	4.29	0.146	0.169	
N	7.62 BSC		3		
ΦP	3.56	3.66	0.14	0.144	
$\Phi P1$	-	6.98	-	0.275	
Q	5.31	5.69	0.209	0.224	
R	0.452	5.49	0.178	0.216	
S	5.51 BSC		0.217 BSC		

Notes

- (1) Dimensioning and tolerance per ASME Y14.5M-1994
- (2) Contour of slot optional
- (3) Dimension D and E do not include mold flash. Mold flash shall not exceed 0.127 mm (0.005") per side. These dimensions are measured at the outermost extremes of the plastic body
- (4) Thermal pad contour optional with dimensions D1 and E1
- (5) Lead finish uncontrolled in L1
- (6) ΦP to have a maximum draft angle of 1.5 to the top of the part with a maximum hole diameter of 3.91 mm (0.154")
- (7) Outline conforms to JEDEC outline TO-247 with exception of dimension c